REMARKS

Claims 1-11 are pending in the application. These claims were rejected as follows:

Claims / Section	35 U.S.C. Sec.	References / Notes
1	§102(b) Anticipation	• Anderson (U.S. Patent No. 5,721,783).
2-11	§103(a) Obviousness	• Anderson (U.S. Patent No. 5,721,783); and • Sano (U.S. Patent No. 6,828,868).

Applicants have amended independent claim 1 in the application and have provided discussion for distinguishing the claims, as amended, from the art cited against it.

Applicants' use of reference characters below is for illustrative purposes only and is not intended to be limiting in nature unless explicitly indicated.

35 U.S.C. §102(b), Claim 1 Anticipation by Anderson

1. Claim 1 of the present application has been amended to indicate that the transmitting antenna of the present invention is the coil of the oscillator circuit and therefore does not require that the antenna and oscillator comprise separate devices.

In the OA, on p. 2, the Examiner rejected claim 1 as being anticipated by Anderson and cited portions of Anderson as reading on each of the elements of claim 1.

Applicants have amended claim 1 to clarify that the coil device of the oscillator circuit is used as the antenna device for radiating the transmission signal.

The Examiner cites to Figure 4, references 40-42, of Anderson as disclosing the antenna and resonator configuration that corresponds to the antenna device claimed. With claim 1, as amended, Anderson can be distinguished on the following basis.

The antenna referred to by the Examiner in Anderson is represented by element 40 in Figures 4 and 8. In Figure 4, the antenna 40 is illustrated as being connected to two series resonant circuits 41, 42, comprising an inductor and capacitor connected in series with the antenna 40. The antenna itself is identified as being a single quarter-wave Marconi antenna (11/31-32). It is well-known in the art that a Marconi antenna is a quarter wave antenna made of a conducting material that utilizes a good RF ground with the earth to produce a mirror image of the missing half of the desired half wave antenna. See the Appendix, Figure 2 and associated discussion.

Thus, the antenna 40 of Anderson is an element that is separate and distinct from any component of the resonant circuit 41, 42. Anderson further highlights this fact by indicating that the antenna 40 is of a length which can be useful in the role of earpiece extractor. 11/39-40.

Applicants have inventively recognized the advantage to the size and power of the transmission mechanism by utilizing the coil device of the oscillator circuit as the antenna device that is used for transmission and reception. In other

words, the coil serves a dual purpose—that of a component of the oscillator circuit, and that of the transmission and reception antenna. Thus, a separate antenna section is unnecessary in the embodiment claimed in claim 1.

Anderson's disclosure of a hearing aid with an antenna 40 and two series resonant circuits 41, 42, means that Anderson needs three elements for receiving and transmitting: two coils and one antenna. This is clearly contrary to the advantageous configuration of the present invention which seeks to minimize power and space by the use of the single oscillator coil serving the role of the antenna.

For these reasons, Applicants assert that claim 1 of the present invention, as amended, is not anticipated by Anderson and respectfully request that the Examiner withdraw the 35 U.S.C. §102 rejection from the present application.

35 U.S.C. §103(a), CLAIMS 2-11 OBVIOUSNESS OVER ANDERSON IN VIEW OF SANO

2. Applicants rely on the arguments above, based on amended claim 1, and assert that the addition of Sano to Anderson fails to teach or suggest the use of the coil in the oscillator circuit being used as the transmission and reception antenna.

In the OA, on pp. 3-5, the Examiner rejected claims 2-11 as being obvious over the combination of Anderson and Sano.

Applicants have amended independent claim 1, upon which the remaining claims depend, and assert that, like Anderson, Sano fails to teach or suggest a device in which the oscillator coil is also used as the transmission/reception mechanism. The Examiner cited Sano as teaching various aspects of the

dependent claims—the arguments are not addressed on the merits of these features themselves, rather the Applicants rely on the arguments above with respect to amended claim 1.

Applicants further argue that one of ordinary skill in the art would not combine Sano with the present invention, since the present invention deals with the field of hearing aids. Although Sano does address issues related to oscillating circuits, it does so in a context devoid of the constraints present in a hearing aid device, namely that hearing aids must consume very low amounts of energy in order to be practical—this is the very issue that is addressed by the advantageous configuration of the present invention.

For these reasons, Applicants assert that claims 2-11 of the present invention, depending from claim 1 as amended, are not obvious over the combination of Anderson and Sano and respectfully request that the Examiner withdraw the 35 U.S.C. §103 rejection from the present application.

CONCLUSION

Inasmuch as each of the objections have been overcome by the amendments, and all of the Examiner's suggestions and requirements have been satisfied, it is respectfully requested that the present application be reconsidered, the rejections be withdrawn and that a timely Notice of Allowance be issued in this case.

Respectfully submitted,

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CERTIFICATE OF FACSIMILE

I hereby certify that this correspondence is being telefaxed to the U.S. Patent and Trademark Office telephone number 571-273-8300 and addressed to: Mail Stop Amendment Commissioner for Patents, PO Box 1450, Alexandria, VA 22313-1450 on July 19, 2006.

Mark Bergner

APPENDIX
DESCRIPTION OF MARCONI ANTENNA

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LAST MODIFIED:
Wednesday, 30-Nov-2005 19:12:10 PST

ANTENNA BASICS

YOU ARE HERE: HOME > ANTENNAS > ANTENNA BASICS

What are the basics of antennas?

Antennas, to quote a friend, are one of life's eternal mysteries. "All I'm totally certain of is that any antenna is better than no antenna and the antenna should preferably erected as high and be as long as is possible or desirable". Here we will discuss the very basics of antennas. Remember that thought: **these are just some introductory antenna basics.** Each type of antenna will eventually have its own page. In particular I would commend everyone to read my page on earth dangers. I think it ought to be compulsory reading.

The basic antenna

The most basic antenna is called "a quarter wave vertical", it is a quarter **wavelength** long and is a vertical radiator. Typical examples of this type would be seen installed on motor vehicles for two way communications. Technically the most basic antenna is an "isotropic radiator". This is a mythical antenna which radiates in all directions as does the light from a lamp bulb. It is the standard against which we sometimes compare other antennas.

This type of antenna relies upon an "artificial ground" of either drooping radials or a car body to act as ground. Sometimes the antenna is worked against an actual ground - see later.

Antenna Polarisation

Depending upon how the antenna is orientated physically determines it's polarisation. An antenna erected vertically is said to be "vertically polarised" while an antenna erected horizontally is said (not so surprising) to be "horizontally polarised". Other specialised antennas exist with "cross polarisation", having both vertical and horizontal components and we can have "circular polarisation".

Note that when a signal is transmitted at one polarisation but received at a different polarisation there exists a great many decibels of loss.

This is quite significant and is often taken advantage of when TV channels and other services are allocated. If there is a chance of co-channel interference then the license will stipulate a different polarisation. Have you ever noticed vertical and horizontal TV antennas in some areas. Now you know why.

Antenna Impedance

Technically, antenna impedance is the ratio at any given point in the antenna of voltage to current at that point. Depending upon height above ground, the influence of surrounding objects and other factors, our quarter wave antenna with a near perfect ground exhibits a nominal input impedance of around 36 ohms. A half wave dipole antenna is nominally 75 ohms while a half wave folded dipole antenna is nominally 300 ohms. The two previous examples indicate why we have 75 ohm coaxial cable and 300 ohm ribbon line for TV antennas.

A quarter wave antenna with drooping quarter wave radials exhibits a nominal 50 ohms impedance, one reason for the existence of 50 ohm coaxial cable.

The quarter wave vertical antenna

The quarter wave vertical antenna is usually the simplest to construct and erect although I know a great many people who would dispute that statement. In this context I am speaking of people (the majority) who have limited space to erect an antenna.

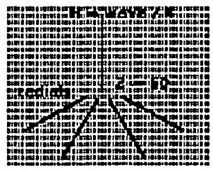

Figure 1. - a quarter wave vertical antenna with drooping radials

In figure 1 we have depicted a quarter wave vertical antenna with drooping radials which would be about 45 degrees from horizontal. These 45 degree drooping radials simulate an artificial ground and lead to an antenna impedance of about 50 ohms.

A quarter wave vertical antenna could also be erected directly on the ground and indeed many AM radio transmitting towers accomplish this especially where there is suitable marshy ground noted for good conductivity. An AM radio transmitting tower of a quarter wave length erected for say 810 Khz in the AM band would have a length of nearly 88 metres (288') in height.

The formula for quarter wave is L = 71.25 metres / freq (mhz) and in feet L = 234 / freq (mhz). Note the variance from the standard wavelength formula of 300 / freq. This is because we allow for "velocity factor" of 5% and our wavelength formula becomes 285 / freq.

When a quarter wave antenna is erected and "worked" against a good rf ground (called a Marconi Antenna) the earth provides a "mirror" image of the missing half of the desired half wave antenna.

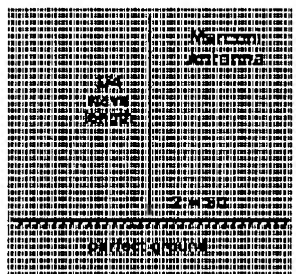

Figure 2. - a marconi antenna

In figure 2 above where I have depicted the Marconi Antenna imagine a duplicate of the quarter wave antenna being in existence from the top of the ground and extending down the page. This is the mirror image.

Half wave dipole antenna

The half wave dipole antenna becomes quite common where space permits. It can be erected vertically but is more often than not erected horizontally for practical reasons. I gave quite a good example of its use in my paper on radio telescopes from my original site. I have reproduced it in figure 3 below.

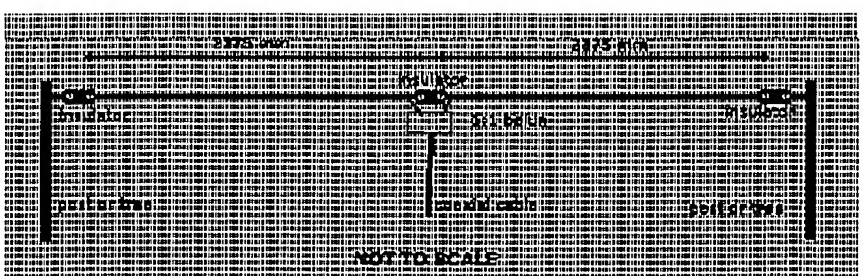

Figure 3. - half wave dipole antenna

This particular antenna was dimensioned for use at 30 Mhz. You will note that the left and right hand halves

are merely quarter wave sections determined by the formula given earlier. The input impedance (affected by many factors) is nominally 50 ohms.

As with all antennas, the height above ground and proximity to other objects such as buildings, trees, guttering etc. play an important part. However, reality says we must live with what we can achieve in the real world notwithstanding what theory may say.

People erect half wave dipoles in attics constructed of fine gauge wire - far from ideal BUT they get reasonable results by living with less than the "ideal". A lesson in life we should always remember in more ways than one.

The folded dipole antenna

The folded dipole antenna is probably only ever seen as a TV antenna. It exhibits an impedance of 300 ohms whereas a half wave dipole is 75 ohms and I'm certain someone will be alert enough to ask "why 75 ohms, if figure 3 above is 50 ohms?".

Within the limits of my artistic skills I have depicted a folded dipole antenna below.

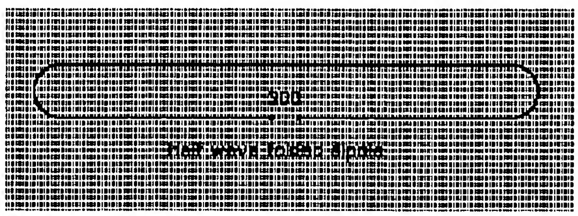

Figure 4. - half wave folded dipole

One powerful advantage of a folded dipole antenna is that is has a wide bandwidth, in fact a one octave bandwidth. This is the reason it was often used as a TV antenna for multi channel use. Folded dipole antennas were mainly used in conjuction with Yagi antennas.

The Yagi antenna

The Yagi antenna or more correctly, the Yagi - Uda antenna was developed by Japanese scientists in the 1930's. It consists of a half wave dipole (sometimes a folded one, sometimes not), a rear "reflector" and may or may not have one or more forward "directors". These are collectively referred to as the "elements".

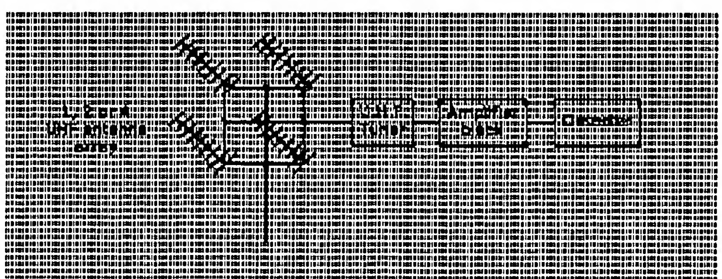

Figure 5. - the Yagi antenna

In figure 5 above I have reprinted a UHF Yagi antenna array from my radio telescopes page. You will note, not altogther clearly.

However in figure 6 below, which happens to be a photograph of a neighbour's TV antenna, I can clearly point out details of a practical Yagi antenna.

This particular antenna has been optimised for dual band operation. It is designed to pick up both VHF and UHF transmissions. Because I live in a regional of NSW in Australia, TV antennas tend to be single channel types designed either for higher gain or better directivity. Different examples will be presented later.